SEQUENCE LISTING

<110> The Government of the United States of America as
represented by the Secretary of the Department of Health and
Human Services
Nelson, Lawrence
Tong, Zhi-Bin

<120> Human Gene Critical to Fertility

<130> 4239-64790

<150> 60/241,510
<151> 2000-10-18

<150> PCT/US02/09776
<151> 2002-03-29

<150> PCT/US01/10981
<151> 2001-04-04

<160> 42

<170> PatentIn version 3.2

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Lys Leu Cys Lys Asp Thr Ala Glu Lys Gln Pro Pro Phe Thr Leu Ile
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Arg Ser Leu Leu Arg Lys Val Leu Leu Pro Glu Ser Phe Leu Ile Val
    50                  55                  60


Thr Val Arg Asp Val Gly Thr Glu Lys Leu Lys Ser Glu Val Val Ser
65                  70                  75                  80


Pro Arg Tyr Leu Leu Val Arg Gly Ile Ser Gly Glu Gln Arg Ile His
                85                  90                  95


Leu Leu Leu Glu Arg Gly Ile Gly Glu His Gln Lys Thr Gln Gly Leu
            100                 105                 110


Arg Ala Ile Met Asn Asn Arg Glu Leu Leu Asp Gln Cys Gln Val Pro
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Ala Val Gly Ser Leu Ile Cys Val Ala Leu Gln Leu Gln Asp Val Val
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Gly Glu Ser Val Ala Pro Phe Asn Gln Thr Leu Thr Gly Leu His Ala
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Ala Phe Val Phe His Gln Leu Thr Pro Arg Gly Val Val Arg Arg Cys
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Met Val Gln Gly Leu Gly Glu Ser Glu Leu Arg Ala Leu Phe His Met
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Gly Leu Glu Ile Glu Pro Ala Leu Cys Pro Leu Tyr Val Glu Lys Thr
            260                 265                 270

Lys Arg Ser Met Glu Leu Lys Gln Ala Gly Phe His Ile His Ser Leu
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Thr Met Lys Arg Phe Leu Phe Gly Leu Val Ser Glu Asp Val Arg Arg
    290                 295                 300

Pro Leu Glu Val Leu Leu Gly Cys Pro Val Pro Leu Gly Val Lys Gln
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Thr Pro Gly Asp Thr Leu Asp Ala Phe His Cys Leu Phe Glu Thr Gln
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Asp Lys Glu Phe Val Arg Leu Ala Leu Asn Ser Phe Gln Glu Val Thr
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385


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Met Arg Leu Pro His Cys Ser Leu Gln Arg Leu Met Leu Asn Gln Cys
        35                  40                  45


His Leu Asp Thr Ala Gly Cys Gly Ser Leu Ala Leu Ala Leu Met Gly
    50                  55                  60
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Asp Leu Thr Asp Asn Ala Leu Gly Asp Gly Gly Val Ala Ala Leu Cys
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Glu Gly Leu Lys Gln Lys Asn Ser Val Leu Thr Arg Leu Gly Leu Lys
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Ala Cys Gly Leu Thr Ser Asp Cys Cys Glu Ala Leu Ser Leu Ala Leu
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195 200 205

Ser Asn Leu Gln Ile Ile Gly Leu Thr Lys Thr Gln Tyr Pro Val Gln
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Ser Glu Ser Thr Met Gly Pro Pro Glu Lys Asp Ser Lys Ala Ile Leu
    50                  55                  60

Lys Ala Arg Gly Leu Glu Glu Glu Gln Lys Ser Glu Ser Thr Met Ser
65                  70                  75                  80

Pro Ser Glu Asn Val Ser Arg Ala Ile Leu Lys Asp Ser Gly Ser Glu
                85                  90                  95

Glu Val Glu Gln Ala Ser Glu Arg Lys Met Thr Ser Pro Glu Asn Asp
            100                 105                 110

Ser Lys Ser Ile Gln Lys Asp Gln Gly Pro Glu Gln Glu Gln Thr Ser
        115                 120                 125

Glu Thr Leu Gln Ser Lys Glu Glu Asp Glu Val Thr Glu Ala Asp Lys
    130                 135                 140

Asp Asn Gly Gly Asp Leu Gln Asp Tyr Lys Ala His Val Ile Ala Lys
145                 150                 155                 160

Phe Asp Thr Ser Val Asp Leu His Tyr Asp Ser Pro Glu Met Lys Leu
                165                 170                 175

Leu Ser Asp Ala Phe Lys Pro Tyr Gln Lys Thr Phe Gln Pro His Thr
            180                 185                 190

Ile Ile Leu His Gly Arg Pro Gly Val Gly Lys Ser Ala Leu Ala Arg
        195                 200                 205

Ser Ile Val Leu Gly Thr Ala Gln Gly Lys Leu Phe Gln Lys Met Ser
    210                 215                 220

Phe Val Ile Phe Phe Ser Val Arg Glu Ile Lys Thr Thr Glu Lys Ser
225                 230                 235                 240

Ser Leu Ala Gln Leu Ile Ala Lys Glu Cys Pro Asp Ser Thr Asp Leu
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Gly Leu Asp Asp Met Asp Ser Val Leu Gln His Asp Asp Met Thr Leu
        275                 280                 285

Ser Arg Asp Thr Lys Asp Glu Gln Pro Ile Tyr Ile Leu Met Tyr Ser
    290                 295                 300

Leu Leu Arg Lys Ala Leu Leu Pro Gln Ser Phe Leu Ile Ile Thr Thr
305                 310                 315                 320

Arg Asn Thr Gly Leu Glu Lys Leu Lys Ser Met Val Val Ser Pro Leu
                325                 330                 335

Tyr Ile Leu Val Glu Gly Leu Ser Ala Ser Arg Arg Ser Gln Leu Val
            340                 345                 350

Leu Glu Asn Ile Ser Asn Glu Ser Asp Arg Ile Gln Val Phe His Ser
        355                 360                 365

Leu Ile Glu Asn His Gln Leu Phe Asp Gln Cys Gln Ala Pro Ser Val
    370                 375                 380

Cys Ser Leu Val Cys Glu Ala Leu Gln Leu Gln Lys Lys Leu Gly Lys
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Arg Cys Thr Leu Pro Cys Gln Thr Leu Thr Gly Leu Tyr Ala Thr Leu
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            420                 425                 430

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Tyr Ser Leu Lys Glu Ser Glu Ile Leu Ala Leu Phe His Met Asn Ile
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Ile Met Glu Val Lys Arg Thr Asp Asp Thr Arg Leu Leu Gly Met Lys
    530                 535                 540

Arg Phe Leu Phe Gly Leu Met Asn Lys Asp Ile Leu Lys Thr Leu Glu
545                 550                 555                 560

Val Leu Phe Glu Tyr Pro Val Ile Pro Thr Val Glu Gln Lys Leu Gln
                565                 570                 575

His Thr Val Ser Leu Ile Ala Gln Gln Val Asn Gly Thr Ser Pro Met
            580                 585                 590

Asp Thr Leu Asp Ala Phe Tyr Cys Leu Phe Glu Ser Gln Asp Glu Glu
        595                 600                 605

Phe Val Gly Gly Ala Leu Lys Arg Phe Gln Glu Val Thr Leu Leu Ile
    610                 615                 620

Asn Gln Lys Met Asp Leu Lys Val Ser Ser Tyr Cys Leu Lys His Cys
625                 630                 635                 640

Gln Asn Leu Lys Ala Ile Arg Val Asp Ile Arg Asp Leu Leu Ser Val
                645                 650                 655

Asp Asn Thr Leu Glu Leu Cys Pro Val Val Thr Val Gln Glu Thr Gln
            660                 665                 670

Cys Lys Pro Leu Leu Met Glu Thr Thr Gly Asn Phe Cys Ser Val Leu
        675                 680                 685

Gly Ser Leu Arg Asn Leu Lys Glu Leu Asp Leu Gly Asp Ser Ile Leu
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Ser Gln Arg Ala Met Lys Ile Leu Cys Leu Glu Leu Arg Asn Gln Ser
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Cys Arg Ile Gln Lys Leu Thr Phe Lys Ser Ala Glu Val Val Ser Gly
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Cys Glu Ala Leu Lys His Pro Lys Cys Ser Val Glu Thr Leu Arg Leu
    770                 775                 780

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785                 790                 795                 800

Leu Ile Ser Thr Thr Arg Leu Lys Cys Leu Ser Leu Ala Lys Asn Arg
                805                 810                 815

Val Gly Val Lys Ser Met Ile Ser Leu Gly Asn Ala Leu Ser Ser Ser
            820                 825                 830

Met Cys Leu Leu Gln Lys Leu Ile Leu Asp Asn Cys Gly Leu Thr Pro
        835                 840                 845

Ala Ser Cys His Leu Leu Val Ser Ala Leu Phe Ser Asn Gln Asn Leu
    850                 855                 860

Thr His Leu Cys Leu Ser Asn Asn Ser Leu Gly Thr Glu Gly Val Gln
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Gln Leu Cys Gln Phe Leu Arg Asn Pro Glu Cys Ala Leu Gln Arg Leu
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            900                 905                 910

Met Arg Leu Ala Asn Asn Thr Lys Leu Thr His Leu Ser Leu Thr Met
        915                 920                 925

Asn Pro Val Gly Asp Gly Ala Met Lys Leu Leu Cys Glu Ala Leu Lys
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Glu Pro Thr Cys Tyr Leu Gln Glu Leu Glu Leu Val Asp Cys Gln Leu
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Arg Leu  Gly Leu Gly Ala Cys  Lys Leu Thr Ser Asn  Cys Cys Glu
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Ala Leu  Ser Leu Ala Ile Ser  Cys Asn Pro His Leu  Asn Ser Leu
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Asn Leu  Val Lys Asn Asp Phe  Ser Thr Ser Gly Met  Leu Lys Leu
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Cys Ser  Ala Phe Gln Cys Pro  Val Ser Asn Leu Gly  Ile Ile Gly
    1055                 1060                 1065

Leu Thr  Lys Gln Glu Tyr Tyr  Ala Arg Val Arg Arg  Gln Leu Glu
    1070                 1075                 1080

Glu Val  Glu Phe Val Lys Pro  His Val Val Ile Asp  Gly Asp Thr
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tctggcctca gccctcgtca g                                                 21


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Met Lys Val Ala Gly Gly Leu Glu Leu Gly Ala Ala Ala Leu Leu Ser
1               5                   10                  15

gca tca cca cgt gct ctt gtc act ctt tcc aca ggt cct act tgc tct        96
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Ala Ser Pro Arg Ala Leu Val Thr Leu Ser Thr Gly Pro Thr Cys Ser
            20                  25                  30

ata tta cca aag aat cca ctt ttc ccc caa aac ctg agc tct cag cct      144
Ile Leu Pro Lys Asn Pro Leu Phe Pro Gln Asn Leu Ser Ser Gln Pro
        35                  40                  45

tgt atc aag atg gaa gga gac aaa tcg ctc acc ttt tcc agc tac ggg      192
Cys Ile Lys Met Glu Gly Asp Lys Ser Leu Thr Phe Ser Ser Tyr Gly
    50                  55                  60

ctg caa tgg tgt ctc tat gag cta gac aag gaa gaa ttt cag aca ttc      240
Leu Gln Trp Cys Leu Tyr Glu Leu Asp Lys Glu Glu Phe Gln Thr Phe
65                  70                  75                  80

aag gaa tta cta aag aag aaa tct tca gaa tcg acc aca tgc tct att      288
Lys Glu Leu Leu Lys Lys Lys Ser Ser Glu Ser Thr Thr Cys Ser Ile
                85                  90                  95

cca cag ttt gaa atc gag aat gcc aac gtg gaa tgt ctg gca ctc ctc      336
Pro Gln Phe Glu Ile Glu Asn Ala Asn Val Glu Cys Leu Ala Leu Leu
            100                 105                 110

ttg cat gag tat tat gga gca tcg ctg gcc tgg gct acg tcc att agc      384
Leu His Glu Tyr Tyr Gly Ala Ser Leu Ala Trp Ala Thr Ser Ile Ser
        115                 120                 125

atc ttt gaa aac atg aac ctg cga acc ctc tcg gag aag gca cgg gat      432
Ile Phe Glu Asn Met Asn Leu Arg Thr Leu Ser Glu Lys Ala Arg Asp
    130                 135                 140

gac atg aaa aga cat tca cca gaa gat cct gaa gca acg atg act gac      480
Asp Met Lys Arg His Ser Pro Glu Asp Pro Glu Ala Thr Met Thr Asp
145                 150                 155                 160

caa gga cca agc aag gaa aaa gtg cca gga att tca caa gct gtg caa      528
Gln Gly Pro Ser Lys Glu Lys Val Pro Gly Ile Ser Gln Ala Val Gln
                165                 170                 175

caa gat agt gcc aca gct gca gag aca aaa gaa cag gaa att tca caa      576
Gln Asp Ser Ala Thr Ala Ala Glu Thr Lys Glu Gln Glu Ile Ser Gln
            180                 185                 190

gct atg gaa caa gaa ggt gcc aca gca gca gag aca gaa gaa caa gaa      624
Ala Met Glu Gln Glu Gly Ala Thr Ala Ala Glu Thr Glu Glu Gln Glu
        195                 200                 205

att tca caa gct atg gaa caa gaa ggt gcc aca gca gca gag aca gaa      672
Ile Ser Gln Ala Met Glu Gln Glu Gly Ala Thr Ala Ala Glu Thr Glu
    210                 215                 220

gaa caa gga cat gga ggt gac aca tgg gac tac aag agt cac gtg atg      720
Glu Gln Gly His Gly Gly Asp Thr Trp Asp Tyr Lys Ser His Val Met
225                 230                 235                 240

acc aaa ttc gct gag gag gag gat gta cgt cgt agt ttt gaa aac act      768
Thr Lys Phe Ala Glu Glu Glu Asp Val Arg Arg Ser Phe Glu Asn Thr
                245                 250                 255

gct gct gac tgg ccg gaa atg caa acg ttg gct ggt gct ttt gat tca      816
Ala Ala Asp Trp Pro Glu Met Gln Thr Leu Ala Gly Ala Phe Asp Ser
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            260                 265                 270

gac cgg tgg ggc ttc cgg cct cgc acg gtg gtt ctg cac gga aag tca       864
Asp Arg Trp Gly Phe Arg Pro Arg Thr Val Val Leu His Gly Lys Ser
        275                 280                 285

gga att ggg aaa tcg gct cta gcc aga agg atc gtg ctg tgc tgg gcg       912
Gly Ile Gly Lys Ser Ala Leu Ala Arg Arg Ile Val Leu Cys Trp Ala
    290                 295                 300

caa ggt gga ctc tac cag gga atg ttc tcc tac gtc ttc ttc ctc ccc       960
Gln Gly Gly Leu Tyr Gln Gly Met Phe Ser Tyr Val Phe Phe Leu Pro
305                 310                 315                 320

gtt aga gag atg cag cgg aag aag gag agc agt gtc aca gag ttc atc      1008
Val Arg Glu Met Gln Arg Lys Lys Glu Ser Ser Val Thr Glu Phe Ile
                325                 330                 335

tcc agg gag tgg cca gac tcc cag gct ccg gtg acg gag atc atg tcc      1056
Ser Arg Glu Trp Pro Asp Ser Gln Ala Pro Val Thr Glu Ile Met Ser
            340                 345                 350

cga cca gaa agg ctg ttg ttc atc att gac ggt ttc gat gac ctg ggc      1104
Arg Pro Glu Arg Leu Leu Phe Ile Ile Asp Gly Phe Asp Asp Leu Gly
        355                 360                 365

tct gtc ctc aac aat gac aca aag ctc tgc aaa gac tgg gct gag aag      1152
Ser Val Leu Asn Asn Asp Thr Lys Leu Cys Lys Asp Trp Ala Glu Lys
    370                 375                 380

cag cct ccg ttc acc ctc ata cgc agt ctg ctg agg aag gtc ctg ctc      1200
Gln Pro Pro Phe Thr Leu Ile Arg Ser Leu Leu Arg Lys Val Leu Leu
385                 390                 395                 400

cct gag tcc ttc ctg atc gtc acc gtc aga gac gtg ggc aca gag aag      1248
Pro Glu Ser Phe Leu Ile Val Thr Val Arg Asp Val Gly Thr Glu Lys
                405                 410                 415

ctc aag tca gag gtc gtg tct ccc cgt tac ctg tta gtt aga gga atc      1296
Leu Lys Ser Glu Val Val Ser Pro Arg Tyr Leu Leu Val Arg Gly Ile
            420                 425                 430

tcc ggg gaa caa aga atc cac ttg ctc ctt gag cgc ggg att ggt gag      1344
Ser Gly Glu Gln Arg Ile His Leu Leu Leu Glu Arg Gly Ile Gly Glu
        435                 440                 445

cat cag aag aca caa ggg ttg cgt gcg atc atc aac aac cgt gag ctg      1392
His Gln Lys Thr Gln Gly Leu Arg Ala Ile Ile Asn Asn Arg Glu Leu
    450                 455                 460

ctc gac cag tgc cag gtg ccc gcc gtg ggc tct ctc atc tgc gtg gcc      1440
Leu Asp Gln Cys Gln Val Pro Ala Val Gly Ser Leu Ile Cys Val Ala
465                 470                 475                 480

ctg cag ctg cag gac gtg gtg ggg gag agc gtc gcc ccc ttc aac caa      1488
Leu Gln Leu Gln Asp Val Val Gly Glu Ser Val Ala Pro Phe Asn Gln
                485                 490                 495

acg ctc aca ggc ctg cac gcc gct ttt gcg ttt cat cag ctc acc cct      1536
Thr Leu Thr Gly Leu His Ala Ala Phe Ala Phe His Gln Leu Thr Pro
            500                 505                 510
```

```
cga ggc gtg gtc cgg cgc tgt ctc aat ctg gag gaa aga gtt gtc ctg      1584
Arg Gly Val Val Arg Arg Cys Leu Asn Leu Glu Glu Arg Val Val Leu
        515                 520                 525

aag cgc ttc tgc cgt atg gct gtg gag gga gtg tgg aat agg aag tca      1632
Lys Arg Phe Cys Arg Met Ala Val Glu Gly Val Trp Asn Arg Lys Ser
    530                 535                 540

gtg ttt gat ggt gac gac ctc atg gtt caa gga ctc ggg gag tct gag      1680
Val Phe Asp Gly Asp Asp Leu Met Val Gln Gly Leu Gly Glu Ser Glu
545                 550                 555                 560

ctc cgt gct ctg ttt cac atg aac atc ctt ctc cca gac agc cac tgt      1728
Leu Arg Ala Leu Phe His Met Asn Ile Leu Leu Pro Asp Ser His Cys
                565                 570                 575

gag gag tac tac acc ttc ttc cac ctc agt ctc cag gac ttc tgt gcc      1776
Glu Glu Tyr Tyr Thr Phe Phe His Leu Ser Leu Gln Asp Phe Cys Ala
            580                 585                 590

gcc ttg tac tac gtg tta gag ggc ctg gaa atc gag cca gct ctc tgc      1824
Ala Leu Tyr Tyr Val Leu Glu Gly Leu Glu Ile Glu Pro Ala Leu Cys
        595                 600                 605

cct ctg tac gtt gag aag aca aag agg tcc atg gag ctt aaa cag gca      1872
Pro Leu Tyr Val Glu Lys Thr Lys Arg Ser Met Glu Leu Lys Gln Ala
    610                 615                 620

ggc ttc cat atc cac tcg ctt tgg atg aag cgt ttc ttg ttt ggc ctc      1920
Gly Phe His Ile His Ser Leu Trp Met Lys Arg Phe Leu Phe Gly Leu
625                 630                 635                 640

gtg agc gaa gac gta agg agg cca ctg gag gtc ctg ctg ggc tgt ccc      1968
Val Ser Glu Asp Val Arg Arg Pro Leu Glu Val Leu Leu Gly Cys Pro
                645                 650                 655

gtt ccc ctg ggg gtg aag cag aag ctt ctg cac tgg gtc tct ctg ttg      2016
Val Pro Leu Gly Val Lys Gln Lys Leu Leu His Trp Val Ser Leu Leu
            660                 665                 670

ggt cag cag cct aat gcc acc acc cca gga gac acc ctg gac gcc ttc      2064
Gly Gln Gln Pro Asn Ala Thr Thr Pro Gly Asp Thr Leu Asp Ala Phe
        675                 680                 685

cac tgt ctt ttc gag act caa gac aaa gag ttt gtt cgc ttg gca tta      2112
His Cys Leu Phe Glu Thr Gln Asp Lys Glu Phe Val Arg Leu Ala Leu
    690                 695                 700

aac agc ttc caa gaa gtg tgg ctt ccg att aac cag aac ctg gac ttg      2160
Asn Ser Phe Gln Glu Val Trp Leu Pro Ile Asn Gln Asn Leu Asp Leu
705                 710                 715                 720

ata gca tct tcc ttc tgc ctc cag cac tgt ccg tat ttg cgg aaa att      2208
Ile Ala Ser Ser Phe Cys Leu Gln His Cys Pro Tyr Leu Arg Lys Ile
                725                 730                 735

cgg gtg gat gtc aaa ggg atc ttc cca aga gat gag tcc gct gag gca      2256
Arg Val Asp Val Lys Gly Ile Phe Pro Arg Asp Glu Ser Ala Glu Ala
            740                 745                 750
```

```
tgt cct gtg gtc cct cta tgg atg cgg gat aag acc ctc att gag gag      2304
Cys Pro Val Val Pro Leu Trp Met Arg Asp Lys Thr Leu Ile Glu Glu
        755                 760                 765

cag tgg gaa gat ttc tgc tcc atg ctt ggc acc cac cca cac ctg cgg      2352
Gln Trp Glu Asp Phe Cys Ser Met Leu Gly Thr His Pro His Leu Arg
    770                 775                 780

cag ctg gac ctg ggc agc agc atc ctg aca gag cgg gcc atg aag acc      2400
Gln Leu Asp Leu Gly Ser Ser Ile Leu Thr Glu Arg Ala Met Lys Thr
785                 790                 795                 800

ctg tgt gcc aag ctg agg cat ccc acc tgc aag ata cag acc ctg atg      2448
Leu Cys Ala Lys Leu Arg His Pro Thr Cys Lys Ile Gln Thr Leu Met
                805                 810                 815

ttt aga aat gca cag att acc cct ggt gtg caa cac ctc tgg aga atc      2496
Phe Arg Asn Ala Gln Ile Thr Pro Gly Val Gln His Leu Trp Arg Ile
            820                 825                 830

gtc atg gcc aac cgt aac cta aga tcc ctc aac ttg gga ggc acc cac      2544
Val Met Ala Asn Arg Asn Leu Arg Ser Leu Asn Leu Gly Gly Thr His
        835                 840                 845

ctg aag gaa gag gat gta agg atg gcg tgt gaa gcc tta aaa cac cca      2592
Leu Lys Glu Glu Asp Val Arg Met Ala Cys Glu Ala Leu Lys His Pro
    850                 855                 860

aaa tgt ttg ttg gag tct ttg agg ctg gat tgc tgt gga ttg acc cat      2640
Lys Cys Leu Leu Glu Ser Leu Arg Leu Asp Cys Cys Gly Leu Thr His
865                 870                 875                 880

gcc tgt tac ctg aag atc tcc caa atc ctt acg acc tcc ccc agc ctg      2688
Ala Cys Tyr Leu Lys Ile Ser Gln Ile Leu Thr Thr Ser Pro Ser Leu
                885                 890                 895

aaa tct ctg agc ctg gca gga aac aag gtg aca gac cag gga gta acg      2736
Lys Ser Leu Ser Leu Ala Gly Asn Lys Val Thr Asp Gln Gly Val Thr
            900                 905                 910

cct ctc agt gat gcc ttg agg gtc tcc cag tgc gcc ctg cag aag ctg      2784
Pro Leu Ser Asp Ala Leu Arg Val Ser Gln Cys Ala Leu Gln Lys Leu
        915                 920                 925

ata ctg gag gac tgt ggc atc aca gcc acg ggt tgc cag agt ctg gcc      2832
Ile Leu Glu Asp Cys Gly Ile Thr Ala Thr Gly Cys Gln Ser Leu Ala
    930                 935                 940

tca gcc ctc gtc agc aac cgg agc ttg aca cac ctg tgc cta tcc aac      2880
Ser Ala Leu Val Ser Asn Arg Ser Leu Thr His Leu Cys Leu Ser Asn
945                 950                 955                 960

aac agc ctg ggg aac gaa ggt gta aat cta ctg tgt cga tcc atg agg      2928
Asn Ser Leu Gly Asn Glu Gly Val Asn Leu Leu Cys Arg Ser Met Arg
                965                 970                 975

ctt ccc cac tgt agt ctg cag agg ctg atg ctg aat cag tgc cac ctg      2976
Leu Pro His Cys Ser Leu Gln Arg Leu Met Leu Asn Gln Cys His Leu
            980                 985                 990

gac acg gct ggc tgt ggt tct ctt  gca ctt gcg ctt atg  ggt aac tca    3024
```

```
Asp Thr Ala Gly Cys Gly Ser Leu  Ala Leu Ala Leu Met  Gly Asn Ser
        995                 1000                 1005

tgg ctg  acg cac ctg agc ctt  agc atg aac cct gtg  gaa gac aat      3069
Trp Leu  Thr His Leu Ser Leu  Ser Met Asn Pro Val  Glu Asp Asn
    1010                 1015                 1020

ggc gtg  aag ctt ctg tgc gag  gtc atg aga gaa cca  tct tgt cat      3114
Gly Val  Lys Leu Leu Cys Glu  Val Met Arg Glu Pro  Ser Cys His
    1025                 1030                 1035

ctc cag  gac ctg gag ttg gta  aag tgt cat ctc acc  gcc gcg tgc      3159
Leu Gln  Asp Leu Glu Leu Val  Lys Cys His Leu Thr  Ala Ala Cys
    1040                 1045                 1050

tgt gag  agt ctg tcc tgt gtg  atc tcg agg agc aga  cac ctg aag      3204
Cys Glu  Ser Leu Ser Cys Val  Ile Ser Arg Ser Arg  His Leu Lys
    1055                 1060                 1065

agc ctg  gat ctc acg gac aat  gcc ctg ggt gac ggt  ggg gtt gct      3249
Ser Leu  Asp Leu Thr Asp Asn  Ala Leu Gly Asp Gly  Gly Val Ala
    1070                 1075                 1080

gcg ctg  tgc gag gga ctg aag  caa aag aac agt gtt  ctg acg aga      3294
Ala Leu  Cys Glu Gly Leu Lys  Gln Lys Asn Ser Val  Leu Thr Arg
    1085                 1090                 1095

ctc ggg  ttg aag gca tgt gga  ctg act tct gat tgc  tgt gag gca      3339
Leu Gly  Leu Lys Ala Cys Gly  Leu Thr Ser Asp Cys  Cys Glu Ala
    1100                 1105                 1110

ctc tcc  ttg gcc ctt tcc tgc  aac cgg cat ctg acc  agt cta aac      3384
Leu Ser  Leu Ala Leu Ser Cys  Asn Arg His Leu Thr  Ser Leu Asn
    1115                 1120                 1125

ctg gtg  cag aat aac ttc agt  ccc aaa gga atg atg  aag ctg tgt      3429
Leu Val  Gln Asn Asn Phe Ser  Pro Lys Gly Met Met  Lys Leu Cys
    1130                 1135                 1140

tcg gcc  ttt gcc tgt ccc acg  tct aac tta cag ata  att ggg ctg      3474
Ser Ala  Phe Ala Cys Pro Thr  Ser Asn Leu Gln Ile  Ile Gly Leu
    1145                 1150                 1155

tgg aaa  tgg cag tac cct gtg  caa ata agg aag ctg  ctg gag gaa      3519
Trp Lys  Trp Gln Tyr Pro Val  Gln Ile Arg Lys Leu  Leu Glu Glu
    1160                 1165                 1170

gtg cag  cta ctc aag ccc cga  gtc gta att gac ggt  agt tgg cat      3564
Val Gln  Leu Leu Lys Pro Arg  Val Val Ile Asp Gly  Ser Trp His
    1175                 1180                 1185

tct ttt  gat gaa gat gac cgg  tac tgg tgg aaa aac  tgaagatacg       3610
Ser Phe  Asp Glu Asp Asp Arg  Tyr Trp Trp Lys Asn
    1190                 1195                 1200

gaaacctgcc ccactcacac ccatctgatg gaggaacttt aaacgctgtt ttctcagagc   3670

aagctatgca cctgggagtt ccttctcaaa gatggagaat gatttctgat tctcacaaag   3730

ccctcaatgg tagtgattct tctgtgttca ctctacgttg gttactggat ttgaaggcta   3790
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gagaccttca agtcatagga ctcagtatct gtgaaatgtc cgtcatatct cagagcatat 3850

agagggaatt aaataaacac aaagcatttg gaaaaaaaaa aaaaaaaaaa 3900

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Met Lys Val Ala Gly Gly Leu Glu Leu Gly Ala Ala Ala Leu Leu Ser
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Ala Ser Pro Arg Ala Leu Val Thr Leu Ser Thr Gly Pro Thr Cys Ser
20 25 30

Ile Leu Pro Lys Asn Pro Leu Phe Pro Gln Asn Leu Ser Ser Gln Pro
35 40 45

Cys Ile Lys Met Glu Gly Asp Lys Ser Leu Thr Phe Ser Ser Tyr Gly
50 55 60

Leu Gln Trp Cys Leu Tyr Glu Leu Asp Lys Glu Glu Phe Gln Thr Phe
65 70 75 80

Lys Glu Leu Leu Lys Lys Lys Ser Ser Glu Ser Thr Thr Cys Ser Ile
85 90 95

Pro Gln Phe Glu Ile Glu Asn Ala Asn Val Glu Cys Leu Ala Leu Leu
100 105 110

Leu His Glu Tyr Tyr Gly Ala Ser Leu Ala Trp Ala Thr Ser Ile Ser
115 120 125

Ile Phe Glu Asn Met Asn Leu Arg Thr Leu Ser Glu Lys Ala Arg Asp
130 135 140

Asp Met Lys Arg His Ser Pro Glu Asp Pro Glu Ala Thr Met Thr Asp
145 150 155 160

Gln Gly Pro Ser Lys Glu Lys Val Pro Gly Ile Ser Gln Ala Val Gln
165 170 175

Gln Asp Ser Ala Thr Ala Ala Glu Thr Lys Glu Gln Glu Ile Ser Gln
180 185 190

Ala Met Glu Gln Glu Gly Ala Thr Ala Ala Glu Thr Glu Glu Gln Glu

```
        195                 200                 205

Ile Ser Gln Ala Met Glu Gln Glu Gly Ala Thr Ala Ala Glu Thr Glu
    210                 215                 220

Glu Gln Gly His Gly Gly Asp Thr Trp Asp Tyr Lys Ser His Val Met
225                 230                 235                 240

Thr Lys Phe Ala Glu Glu Glu Asp Val Arg Arg Ser Phe Glu Asn Thr
                245                 250                 255

Ala Ala Asp Trp Pro Glu Met Gln Thr Leu Ala Gly Ala Phe Asp Ser
            260                 265                 270

Asp Arg Trp Gly Phe Arg Pro Arg Thr Val Val Leu His Gly Lys Ser
        275                 280                 285

Gly Ile Gly Lys Ser Ala Leu Ala Arg Arg Ile Val Leu Cys Trp Ala
    290                 295                 300

Gln Gly Gly Leu Tyr Gln Gly Met Phe Ser Tyr Val Phe Phe Leu Pro
305                 310                 315                 320

Val Arg Glu Met Gln Arg Lys Lys Glu Ser Ser Val Thr Glu Phe Ile
                325                 330                 335

Ser Arg Glu Trp Pro Asp Ser Gln Ala Pro Val Thr Glu Ile Met Ser
            340                 345                 350

Arg Pro Glu Arg Leu Leu Phe Ile Ile Asp Gly Phe Asp Asp Leu Gly
        355                 360                 365

Ser Val Leu Asn Asn Asp Thr Lys Leu Cys Lys Asp Trp Ala Glu Lys
    370                 375                 380

Gln Pro Pro Phe Thr Leu Ile Arg Ser Leu Leu Arg Lys Val Leu Leu
385                 390                 395                 400

Pro Glu Ser Phe Leu Ile Val Thr Val Arg Asp Val Gly Thr Glu Lys
                405                 410                 415

Leu Lys Ser Glu Val Val Ser Pro Arg Tyr Leu Leu Val Arg Gly Ile
            420                 425                 430

Ser Gly Glu Gln Arg Ile His Leu Leu Leu Glu Arg Gly Ile Gly Glu
        435                 440                 445
```

```
His Gln Lys Thr Gln Gly Leu Arg Ala Ile Ile Asn Asn Arg Glu Leu
    450                 455                 460

Leu Asp Gln Cys Gln Val Pro Ala Val Gly Ser Leu Ile Cys Val Ala
465                 470                 475                 480

Leu Gln Leu Gln Asp Val Val Gly Glu Ser Val Ala Pro Phe Asn Gln
                485                 490                 495

Thr Leu Thr Gly Leu His Ala Ala Phe Ala Phe His Gln Leu Thr Pro
            500                 505                 510

Arg Gly Val Val Arg Arg Cys Leu Asn Leu Glu Glu Arg Val Val Leu
        515                 520                 525

Lys Arg Phe Cys Arg Met Ala Val Glu Gly Val Trp Asn Arg Lys Ser
    530                 535                 540

Val Phe Asp Gly Asp Asp Leu Met Val Gln Gly Leu Gly Glu Ser Glu
545                 550                 555                 560

Leu Arg Ala Leu Phe His Met Asn Ile Leu Leu Pro Asp Ser His Cys
                565                 570                 575

Glu Glu Tyr Tyr Thr Phe Phe His Leu Ser Leu Gln Asp Phe Cys Ala
            580                 585                 590

Ala Leu Tyr Tyr Val Leu Glu Gly Leu Glu Ile Glu Pro Ala Leu Cys
        595                 600                 605

Pro Leu Tyr Val Glu Lys Thr Lys Arg Ser Met Glu Leu Lys Gln Ala
    610                 615                 620

Gly Phe His Ile His Ser Leu Trp Met Lys Arg Phe Leu Phe Gly Leu
625                 630                 635                 640

Val Ser Glu Asp Val Arg Arg Pro Leu Glu Val Leu Leu Gly Cys Pro
                645                 650                 655

Val Pro Leu Gly Val Lys Gln Lys Leu Leu His Trp Val Ser Leu Leu
            660                 665                 670

Gly Gln Gln Pro Asn Ala Thr Thr Pro Gly Asp Thr Leu Asp Ala Phe
        675                 680                 685
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```
His Cys Leu Phe Glu Thr Gln Asp Lys Glu Phe Val Arg Leu Ala Leu
    690                 695                 700

Asn Ser Phe Gln Glu Val Trp Leu Pro Ile Asn Gln Asn Leu Asp Leu
705                 710                 715                 720

Ile Ala Ser Ser Phe Cys Leu Gln His Cys Pro Tyr Leu Arg Lys Ile
                725                 730                 735

Arg Val Asp Val Lys Gly Ile Phe Pro Arg Asp Glu Ser Ala Glu Ala
            740                 745                 750

Cys Pro Val Val Pro Leu Trp Met Arg Asp Lys Thr Leu Ile Glu Glu
        755                 760                 765

Gln Trp Glu Asp Phe Cys Ser Met Leu Gly Thr His Pro His Leu Arg
    770                 775                 780

Gln Leu Asp Leu Gly Ser Ser Ile Leu Thr Glu Arg Ala Met Lys Thr
785                 790                 795                 800

Leu Cys Ala Lys Leu Arg His Pro Thr Cys Lys Ile Gln Thr Leu Met
                805                 810                 815

Phe Arg Asn Ala Gln Ile Thr Pro Gly Val Gln His Leu Trp Arg Ile
            820                 825                 830

Val Met Ala Asn Arg Asn Leu Arg Ser Leu Asn Leu Gly Gly Thr His
        835                 840                 845

Leu Lys Glu Glu Asp Val Arg Met Ala Cys Glu Ala Leu Lys His Pro
    850                 855                 860

Lys Cys Leu Leu Glu Ser Leu Arg Leu Asp Cys Cys Gly Leu Thr His
865                 870                 875                 880

Ala Cys Tyr Leu Lys Ile Ser Gln Ile Leu Thr Thr Ser Pro Ser Leu
                885                 890                 895

Lys Ser Leu Ser Leu Ala Gly Asn Lys Val Thr Asp Gln Gly Val Thr
            900                 905                 910

Pro Leu Ser Asp Ala Leu Arg Val Ser Gln Cys Ala Leu Gln Lys Leu
        915                 920                 925
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```
Ile Leu Glu Asp Cys Gly Ile Thr Ala Thr Gly Cys Gln Ser Leu Ala
    930                 935                 940

Ser Ala Leu Val Ser Asn Arg Ser Leu Thr His Leu Cys Leu Ser Asn
945                 950                 955                 960

Asn Ser Leu Gly Asn Glu Gly Val Asn Leu Leu Cys Arg Ser Met Arg
                965                 970                 975

Leu Pro His Cys Ser Leu Gln Arg Leu Met Leu Asn Gln Cys His Leu
            980                 985                 990

Asp Thr Ala Gly Cys Gly Ser Leu  Ala Leu Ala Leu Met  Gly Asn Ser
        995                 1000                 1005

Trp Leu  Thr His Leu Ser Leu  Ser Met Asn Pro Val  Glu Asp Asn
    1010                 1015                 1020

Gly Val  Lys Leu Leu Cys Glu  Val Met Arg Glu Pro  Ser Cys His
    1025                 1030                 1035

Leu Gln  Asp Leu Glu Leu Val  Lys Cys His Leu Thr  Ala Ala Cys
    1040                 1045                 1050

Cys Glu  Ser Leu Ser Cys Val  Ile Ser Arg Ser Arg  His Leu Lys
    1055                 1060                 1065

Ser Leu  Asp Leu Thr Asp Asn  Ala Leu Gly Asp Gly  Gly Val Ala
    1070                 1075                 1080

Ala Leu  Cys Glu Gly Leu Lys  Gln Lys Asn Ser Val  Leu Thr Arg
    1085                 1090                 1095

Leu Gly  Leu Lys Ala Cys Gly  Leu Thr Ser Asp Cys  Cys Glu Ala
    1100                 1105                 1110

Leu Ser  Leu Ala Leu Ser Cys  Asn Arg His Leu Thr  Ser Leu Asn
    1115                 1120                 1125

Leu Val  Gln Asn Asn Phe Ser  Pro Lys Gly Met Met  Lys Leu Cys
    1130                 1135                 1140

Ser Ala  Phe Ala Cys Pro Thr  Ser Asn Leu Gln Ile  Ile Gly Leu
    1145                 1150                 1155

Trp Lys  Trp Gln Tyr Pro Val  Gln Ile Arg Lys Leu  Leu Glu Glu
```

```
    1160                1165                1170


Val Gln  Leu Leu Lys Pro Arg  Val Val Ile Asp Gly  Ser Trp His
    1175                1180                1185


Ser Phe  Asp Glu Asp Asp Arg  Tyr Trp Trp Lys Asn
    1190                1195                1200


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tcttttaaag gta agc gag a                                              20
           Val Ser Glu
           1


<210>  26
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<220>
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<400>  26
tgtcttccag gtt aga ggg g                                              20
           Val Arg Gly
           1


<210>  27
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<220>
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<400>  27
tcttttgcag gtg aat gaa a                                                  20
           Val Asn Glu
           1


<210>  28
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<400>  28
tcttttgcag gtg tgg aaa a                                                  20
           Val Trp Lys
           1


<210>  29
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<400>  29
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           Val Arg Lys
           1


<210>  30
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<400>  30
ctgactccag gtg agt acc c                                                20
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           1


<210>  31
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<220>
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<222>  (1)..(10)

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<222>  (11)..(20)

<400>  31
cctgacatag gta agg ctg c                                                20
           Val Arg Leu
           1


<210>  32
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<220>
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<220>
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<400>  32
cccattgcag gta cgt ctc t                                                20
           Val Arg Leu
           1


<210>  33
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<222>  (11)..(20)

<400>  33
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           Val Ser Ala
           1


<210>  34
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<212>  DNA
<213>  Homo sapiens


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<400>  34
cttcttgcag gtg agt ctg g                                                20
           Val Ser Leu
           1


<210>  35
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<400>  35
tgccccacag gtg agt ttc c                                                20
           Val Ser Phe
           1


<210>  36
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           Val Thr Ser
           1


<210>  37
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<400>  37
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           Val Ser Arg
           1


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<400>  38
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           Val Val Lys
           1


<210>  39
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<400>  39
gcatgggtca gaaggat                                                   17


<210>  40
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<400> 40
gtccagtagt ggtaacc 17

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<400> 41
tgacttctga ttgctgtgag g 21

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<400> 42
ctactggcca tgaccacctt 20